Introduction

This distribution contains Resource Usage Monitor (RUM) Package V. 1.0. This version of the software can be installed over any previous test versions of RUM without any adverse problems.

The Resource Usage Monitor (RUM) Package is a fully automated support tool developed by the Capacity Management (CM) team, which entails the capture of all system and **V***IST***A** option workload specifics from participating sites. This workload data is then summarized on a weekly basis and is automatically transferred via network mail to the Capacity Management National Database.

The Veterans Health Administration (VHA) developed the Resource Usage Monitor (RUM) Package in order to obtain more accurate information regarding the current and future Veterans Health Information Systems and Technology Architecture (**V***IST***A**) system and **V***IST***A** option workload at the VA Medical Centers (VAMCs).

The current version of the package is compatible with all current operating system platforms at the medical centers. Kernel Patch XU*8*107 installed Resource Usage Monitor (RUM) data collection routines for *DSM for OpenVMS* sites. A future Kernel patch will enable the collection of RUM data from *MSM-DOS* and *Caché for Windows NT* system platforms.

Installing the RUM Package software creates the collection process mechanism and other necessary components of the package. The fully automated data collection mechanism entails capturing all system and **V***IST***A** option workload specifics at the site into a temporary ^XTMP("KMPR") collection global. The collection mechanism is continuously monitoring each process on the system while trapping system and **V***IST***A** option workload data.

On a nightly basis, the data within the ^XTMP("KMPR") collection global is moved to the RESOURCE USAGE MONITOR file (#8971.1) and the temporary data within the ^XTMP("KMPR") global is purged. The nightly task also monitors the RESOURCE USAGE MONITOR file to ensure that only a maximum of three weeks worth of data is maintained at the site.

Every Sunday night, the information contained within the RESOURCE USAGE MONITOR file is compressed into weekly statistics. These weekly statistics are converted into an electronic mail message that is automatically transferred via network mail and merged into the Capacity Management National Database. The site also receives a summary of the system workload data in the form of an electronic turn-around message.

IRM staff utilizes the options that are available at the site to manage this package. IRM staff responsible for capacity management tasks at the site can use these options to review system workload trends. Additionally, the IRM staff can review specific workload information for any given **V***IST***A** option.

Implementation and Maintenance

After the initial setup procedures are performed as detailed in the *Resource Usage Monitor (RUM) Package V. 1.0 Installation Guide*, and IRM staff starts the collection process with the package supplied option, the package basically operates transparent to IRM with minimal impact on system resources. The package uses the Kernel supplied TaskMan utility to schedule a background task and it is then rescheduled to run on a regular nightly basis. The nightly time frame for data file upload was chosen in order to keep temporary global information to a minimum size.

Implementation

This distribution of the Resource Usage Monitor (RUM) Package is dependent on the previous installation of Kernel Patch XU*8*107. Therefore, sites should ensure that Kernel Patch XU*8*107 has been successfully installed prior to installing this package. Kernel Patch XU*8*107 installed the Kernel %ZOSVK-namespaced routines. The %ZOSVK* routines contain code that enables use of the $VIEW function to get job table information from the operating system.

Capacity Management (CM) has been given the KMP* namespace for both routines and global(s). The Resource Usage Monitor (RUM) Package utilizes the KMPR namespace for its routines and global. Therefore, you should review your translation table setting(s) to determine the proper placement for the KMP* global namespace.

The Resource Usage Monitor (RUM) Package Version 1.0 creates a new ^KMPR global to store RESOURCE USAGE MONITOR file (#8971.1) information. This global will be trimmed by the nightly *RUM Background Driver* [KMPR BACKGROUND DRIVER] task to contain a maximum of 21 days of data. Testing has shown that a site with 15,000 options, 5000 protocols and 300 Remote Procedure Calls (RPCs) will have a RESOURCE USAGE MONITOR file of approximately 20,000 to 40,000 blocks (i.e., 50 to 100 maps) in size. Therefore, IRM staff should ensure that adequate disk space exists for the ^KMPR global after volume set placement for this global has been determined.

The Resource Usage Monitor (RUM) Package Version 1.0 utilizes the ^XTMP("KMPR") global to store temporary RUM data. This global will contain one day's worth of data at maximum. The temporary ^XTMP("KMPR") global will be purged automatically by the nightly *RUM Background Driver* [KMPR BACKGROUND DRIVER] task. This option is scheduled to run every night at 1 a.m. Testing has shown that a site with 15,000 options, 5000 protocols and 300 Remote Procedure Calls (RPCs) will have a ^XTMP("KMPR") sub-node global of approximately 4000 to 6000 blocks (i.e., 10 to 15 maps) before it is purged every night. Therefore, IRM staff should ensure that adequate disk space exists for the ^XTMP global.

The IRM staff should use the *Status of RUM Collection* [KMPR STATUS COLLECTION] option to ensure that the *RUM Background Driver* [KMPR BACKGROUND DRIVER] is scheduled to run every day at 1 a.m.

If the *RUM Background Driver* [KMPR BACKGROUND DRIVER] is not shown as being scheduled to run in the future, the IRM staff should use the *Schedule/Unschedule Options* [XUTM SCHEDULE] option located under the *Taskman Management* menu to schedule the KMPR BACKGROUND DRIVER option to run every day at 1 a.m.

The Capacity Management (CM) team strongly suggests that this background driver be scheduled to run every day at 1 a.m. This background driver is the main mechanism by which the RESOURCE USAGE MONITOR file (#8971.1) is trimmed and the temporary ^XTMP("KMPR") global is purged. Modification of the frequency and time may have adverse effects on the number of entries within the RESOURCE USAGE MONITOR file and on the size of the temporary ^XTMP("KMPR") global.

The IRM staff should invoke the *Start RUM Collection* [KMPR START COLLECTION] option to begin the collection of system and **V***IST***A** option workload data.

Maintenance

Information throughout this manual is meant to help IRM in the maintenance of the package. The discussion that follows covers the options available to assist IRM in that maintenance. All options for the *RUM Manager Menu* [KMPR RUM MANAGER MENU] can be found under the *Capacity Management* [XTCM MAIN] menu. The XTCM MAIN menu is found under the *Eve* menu and should be assigned to IRM staff member(s) who support(s) this package and other capacity management tasks.

The IRM staff should first invoke the *Status of RUM Collection* [KMPR STATUS COLLECTION] option, which is located under the *RUM Manager Menu* [KMPR RUM MANAGER MENU] to ensure that the *RUM Background Driver* [KMPR BACKGROUND DRIVER] is scheduled to run every day at 1 a.m.

If the *RUM Background Driver* [KMPR BACKGROUND DRIVER] is not shown as being scheduled to run in the future, use the *Schedule/Unschedule Options* [XUTM SCHEDULE] option located under the *Taskman Management* menu to schedule the KMPR BACKGROUND DRIVER option to run every day at 1 a.m.

The Capacity Management (CM) team strongly suggests that this background driver be scheduled to run every day at 1 a.m. This background driver is the main mechanism by which the RESOURCE USAGE MONITOR file (#8971.1) is trimmed and the temporary ^XTMP("KMPR") global is purged. Modification of the frequency and time may have adverse effects on the number of entries within the RESOURCE USAGE MONITOR file and on the size of the temporary ^XTMP("KMPR") global.

The IRM staff should invoke the *Start RUM Collection* [KMPR START COLLECTION] option to begin the collection of system and **V*IST*A** option workload data.

Globals

This version of the Resource Usage Monitor (RUM) Package deletes obsolete RUM data from the temporary ^XTMP("XUCP") global.

KMPR

Description: This global contains data for the RESOURCE USAGE MONITOR file. This global only contains the RESOURCE USAGE MONITOR file (#8971.1).

This global will be trimmed automatically to contain a maximum of 21 days of data. This global is trimmed by the RUM Background Driver [KMPR BACKGROUND DRIVER] option, which is scheduled to run every day at 1 a.m.

Testing has shown that a site with 15,000 options, 5000 protocols and 300 Remote Procedure Calls (RPCs) will have a RESOURCE USAGE MONITOR file of approximately 20,000 to 40,000 blocks (i.e., 50 to 100 maps) in size.

The global should be journalled and translated, if the operating system supports these functions.

Journalling: Mandatory

XTMP("KMPR")

Description: The ^XTMP global is the storage location for inter-process temporary data. The Resource Usage Monitor (RUM) Package uses the ^XTMP("KMPR") sub-node to temporarily store one day's worth of data at maximum.

The contents of this sub-node are deleted by the RUM Background Driver [KMPR BACKGROUND DRIVER] option, which is scheduled to run every day at 1 a.m. Testing has shown that a site with 15,000 options, 5000 protocols and 300 Remote Procedure Calls (RPCs) will have a ^XTMP("KMPR") sub-node global of approximately 4000 to 6000 blocks (i.e., 10 to 15 maps) before it is purged every night.

Per *Kernel V. 8.0 Technical Manual*: The ^XTMP global should not be journalled. However, the ^XTMP global should be translated, if the operating system supports this function.

Journalling: Not recommended

File List

The Resource Usage Monitor (RUM) Package creates a new RESOURCE USAGE MONITOR file (#8971.1).

Files

File Number	File Name	Global	File Description
8971.1	RESOURCE USAGE MONITOR	^KMPR(8971.1	This file stores system and **V*IST*A** option workload information. No data comes with the file.

Templates

The Resource Usage Monitor (RUM) Package does not contain any templates within this version.

Routine List

This version of the Resource Usage Monitor (RUM) Package deletes the obsolete routines in the XUCP* namespaces.

Name	**Description**
KMPRBD01 KMPRBD02 KMPRBD03	Routines that are called by the RUM Background Driver [KMPR BACKGROUND DRIVER] option. These routines take data from the ^XTMP("KMPR") sub-node global and transfer the data to the RESOURCE USAGE MONITOR (#8971.1) file. These routines purge the ^XTMP("KMPR") sub-node global every night. These routines ensure that the RESOURCE USAGE MONITOR file (#8971.1) contains a maximum of 21 days of data. Every Sunday night, these routines create weekly statistics from the data within the RESOURCE USAGE MONITOR file (#8971.1) and upload this information to the Capacity Management National Database.
KMPRENV	An environment check routine that determines whether Kernel patch XU*8.0*107 has been installed. The Resource Usage Monitor installation requires that Kernel patch XU*8.0*107 to be installed first.
KMPRP1	Routine called by the *RUM Data for an Option* [KMPR PRINT OPTION DATA] option. This routine will display all the system workload data elements for a selected option over a given time period. The output lists the data elements per occurrence, as well as, the total amounts for the given time period.
KMPRPG01	Routine called by the *RUM Data for All Nodes (Graph)* [KMPR GRAPH ALL NODES] option. This routine will display a graph of the selected workload data elements for all nodes. The graph gives a total amount for the selected data element over the selected time period.
KMPRPG02	Routine called by the *RUM Data for Single Node (Graph)* [KMPR GRAPH HOURLY SINGLE NODE] option. This routine will display a graph of the selected system workload data elements for a single node. The graph gives a total amount for the selected data element over the selected time period for the entire day.

KMPRPN03	Routine called by the *Package Resource Usage* [KMPR PRINT NODE PERCENT] option. This routine will display the statistics for a specified package namespace per computer node. The printout shows the system workload as a percent of the totals that the given package namespace was running as either an option, protocol, Remote Procedure Call (RPC), HL7 or background task.
KMPRPOST	A post-install routine that deletes obsolete Resource Usage Monitor (RUM) data from the ^XTMP("XUCP") sub-node global. This post-install routine checks and reschedules, if necessary, the RUM Background Driver [KMPR BACKGROUND DRIVER] task. This post-install routine also adds members to the KMP-CAPMAN mail group from either the KMPS-SAGG or A1B5-SAGG mail group.
KMPRSS	Routine has multiple entry points. One entry point displays the current status of the Resource Usage Monitor (RUM) collection routines. Another entry point informs the RUM collection routines to begin collecting system and **V***IST***A** option workload data. Another entry point informs the RUM collection routines to stop collecting data.
KMPRUTL KMPRUTL1 KMPRUTL2	Generic utility routines that are called by varying Resource Usage Monitor (RUM) routines.
ZOSVKRM	*MSM-DOS* specific collection routine. This routine was installed and renamed by Kernel Patch XU*8*107 as %ZOSVKR. A future Kernel patch will enable the collection of RUM data from *MSM-DOS* sites.
ZOSVKRO	*Caché for Windows NT* specific collection routine. This routine was installed and renamed by Kernel Patch XU*8*107 as %ZOSVKR. A future Kernel patch will enable the collection of RUM data from *Caché for Windows NT* sites
ZOSVKRV	*DSM for OpenVMS* specific collection routine that gathers and stores data in the temporary ^XTMP("KMPR") global. This routine was installed and renamed by Kernel Patch XU*8*107 as %ZOSVKR.

Key Variables

The Resource Usage Monitor (RUM) Package V. 1.0 does not employ the use of key variables.

Exported Options

RUM Manager Menu
[KMPR RUM MANAGER MENU]

The *RUM Manager Menu* [KMPR RUM MANAGER MENU] is located under the *Capacity Management* [XTCM MAIN] menu. The XTCM MAIN menu may be assigned to the IRM staff member(s) who support(s) this package and other capacity management tasks. The *RUM Manager Menu* contains the following options:

```
STA      Status of RUM Collection [KMPR STATUS COLLECTION]
STR      Start RUM Collection [KMPR START COLLECTION]
STP      Stop RUM Collection [KMPR STOP COLLECTION]
RPT      RUM Reports ... [KMPR REPORTS MENU]
```

Status of RUM Collection
[KMPR STATUS COLLECTION]

This option displays the current status of the Resource Usage Monitor (RUM) collection routines. This option identifies whether RUM is currently running. Additionally, this option shows the reschedule frequency of the RUM Background Driver [KMPR BACKGROUND DRIVER] and whether the temporary ^XTMP("KMPR") collection global is currently present.

Start RUM Collection
[KMPR START COLLECTION]

This option informs the Resource Usage Monitor (RUM) collection routines to begin collecting system and **V***IST***A** option workload data.

Stop RUM Collection
[KMPR STOP COLLECTION]

This option informs the Resource Usage Monitor (RUM) collection routines to stop collecting data.

RUM Reports
[KMPR REPORTS MENU]

This menu contains various reports that can be generated from the system and **V***IST***A** option workload statistics accumulated within the RESOURCE USAGE MONITOR file (#8971.1).

```
GAN      RUM Data for All Nodes (Graph) [KMPR GRAPH ALL NODES]
GSN      RUM Data by Date for Single Node (Graph)
                          [KMPR GRAPH HOURLY SINGLE NODE]
PDO      RUM Data for an Option [KMPR PRINT OPTION DATA]
PRU      Package Resource Usage [KMPR PRINT NODE PERCENT]
```

RUM Data for All Nodes (Graph)
[KMPR GRAPH ALL NODES]

This option will display a graph of the selected system workload data elements for all nodes. The graph gives a total amount for the selected data element over the selected time period.

RUM Data by Date for Single Node (Graph)
[KMPR GRAPH HOURLY SINGLE NODE]

This option will display a graph of the selected system workload data elements for a single node. The graph gives a total amount for the selected data element over the selected time period for the entire day.

RUM Data for an Option
[KMPR PRINT OPTION DATA]

This option will display all the system workload data elements for a selected option over a given time period. The output lists the data elements per occurrence, as well as, the total amounts for the given time period.

RUM Data for All Nodes (Graph)
[KMPR GRAPH ALL NODES]

This option will display a graph of the selected system workload data elements for all nodes. The graph gives a total amount for the selected data element over the selected time period.

Single Options

The following option does not appear on any menu:

RUM Background Driver
[KMPR BACKGROUND DRIVER]

This option is not assigned to any menu. This option is scheduled through TaskMan to start the Resource Usage Monitor (RUM) Package's background routine. This option should be rescheduled with the *Schedule/Unschedule Options* [XUTM SCHEDULE] under the *Taskman Management* menu for every day at 1 a.m. to ensure that the temporary ^XTMP("KMPR") sub-node global is purged and the RESOURCE USAGE MONITOR file (#8971.1) is trimmed. Modification of the frequency and time may have adverse effects on the size of the temporary ^XTMP("KMPR") sub-node global and on the number of entries within the RESOURCE USAGE MONITOR file.

Menu/Option Assignment

The *RUM Manager Menu* [KMPR RUM MANAGER MENU] menu is located under the *Capacity Management* [XTCM MAIN] menu. The XTCM MAIN menu may be assigned to the IRM staff member(s) who support(s) this package and other capacity management tasks.

Protocols

The Resource Usage Monitor (RUM) Package does not export any protocols with this version.

Archiving and Purging

Archiving

The Resource Usage Monitor (RUM) Package V. 1.0 contains one file called RESOURCE USAGE MONITOR. This file will be automatically trimmed by the RUM Background Driver [KMPR BACKGROUND DRIVER] option to contain a maximum of 21 days of data.

Since the Resource Usage Monitor (RUM) Package automatically maintains a fixed amount of data at the site, archiving functions are not necessary and are not provided.

Purging

Resource usage data is accumulated into the ^XTMP("KMPR") sub-node global and is killed every day at 1 a.m. by the RUM Background Driver [KMPR BACKGROUND DRIVER] option after being moved into the RESOURCE USAGE MONITOR file (#8971.1).

The RESOURCE USAGE MONITOR file will be automatically trimmed by the RUM Background Driver [KMPR BACKGROUND DRIVER] option to contain a maximum of 21 days of data.

Since the Resource Usage Monitor (RUM) Package automatically maintains a fixed amount of data at the site, purging functions are not necessary and are not provided.

Callable Routines

This version of the Resource Usage Monitor (RUM) Package does not provide any entry points that are available for general use.

External Relations

The Resource Usage Monitor (RUM) Package V. 1.0 relies on the following external packages to run effectively:

Package	Minimum Version Needed	Patch Information
Kernel	8.0	Patch XU*8*107
VA FileMan	21.0	
MailMan	7.1	

This version of Resource Usage Monitor (RUM) Package utilizes a Kernel %ZOSVKR routine that utilizes system specific calls. The Kernel %ZOSVKR routine was introduced with the issuance of Kernel Patch XU*8*107.

All operating system interfaces on which the Resource Usage Monitor (RUM) Package is dependent have been encapsulated into the Kernel %ZOSVKR routine. The %ZOSVKR routine contains code that enables use of the $VIEW function to get job table information from the operating system.

This version of Resource Usage Monitor (RUM) Package utilizes Capacity Management (CM) KMPU*-namespaced routines. The KMPU*-namespaced routines are generic utility routines that are not specific to the RUM package. These KMPU*-namespaced routines were introduced with the issuance of the RUM package.

DBA Approvals and Database Integration Agreements

The Database Administrator (DBA) maintains a list of Database Integration Agreements (DBIAs) or mutual agreements between package developers allowing the use of internal entry points or other package-specific features that are not available to the general programming public.

This version of Resource Usage Monitor (RUM) Package is not dependent on any agreements.

Internal Relations

All options in the Resource Usage Monitor (RUM) Package V. 1.0 under the *RUM Manager Menu* [KMPR MANAGER MENU] can function independently. Only the *Schedule/Unschedule Options* [XUTM SCHEDULE] under the *Taskman Management* menu can invoke the RUM Background Driver [KMPR BACKGROUND DRIVER] option.

Relationship of RUM Package with Kernel

This version of Resource Usage Monitor (RUM) Package utilizes a Kernel %ZOSVKR routine that utilizes system specific calls. The Kernel %ZOSVKR routine was introduced with the issuance of Kernel Patch XU*8*107.

Namespace

The Resource Usage Monitor (RUM) Package V. 1.0 has been assigned to the new KMPR namespace. All references to the old XUCP namespace have been removed from this distribution.

Additionally, this version of Resource Usage Monitor (RUM) Package utilizes a Kernel %ZOSVKR routine that utilizes system-specific calls. The Kernel %ZOSVKR routine was introduced with the issuance of Kernel Patch XU*8*107.

Package-wide Variables

The Resource Usage Monitor (RUM) Package V. 1.0 does not employ the use of package-wide variables.

SAC Exemptions

This version of the Resource Usage Monitor (RUM) Package does not employ any exemptions from the Programming Standards and Conventions (SAC). Also, this version of the Resource Usage Monitor (RUM) Package utilizes a Kernel %ZOSVKR routine that utilizes system-specific calls. The Kernel %ZOSVKR routine was introduced with the issuance of Kernel Patch XU*8*107.

Security

Keys

This version of the Resource Usage Monitor (RUM) Package does not contain any security keys.

VA FileMan File Protection

#	Name	DD	RD	WR	DEL	LAYGO
8971.1	RESOURCE USAGE MONITOR	@	@	@	@	@

Y2K Compliance

This version of the Resource Usage Monitor (RUM) Package is fully compliant with all existing Year 2000 (Y2K) requirements as established by VHA for its **V***IST***A** products.

Glossary

BIO reference	Buffered I/O reference. A system workload data element that gives the number of times that a buffered access has been called because of M routine code execution. Terminals and printers are normally considered to be a buffered device within the M environment.
Capacity management	The process of assessing a system's capacity and evaluating its efficiency relative to workload in an attempt to optimize system performance.
CPU Time	A system workload data element that gives the amount of time that the processor has spent executing M routine code.
Data element	A statistical unit by which to measure either system or **V***IST***A** option workload. Eight data elements have been defined: CPU time, elapsed time, M commands, GLO references, DIO references, BIO references, page faults and number of occurrences.
DIO reference	Disk (Direct) I/O reference. A system workload data element that gives the number of times that a disk access has been requested because of M routine code execution.
Elapsed Time	A system workload data element that gives the amount of actual time that has passed while executing M routine code.
GLO reference	Global reference. A system workload data element that gives the number of times that a global variable name has been called because of M routine code execution.
M commands	A system workload data element that gives the number of distinct commands that have been executed while executing M routine code.
Number of occurrences	A system workload data element that gives a total measure of the number of **V***IST***A** option executions.

Page faults	A system workload data element that gives the number of times that a job had to use non-physical (i.e., paged) memory.
RUM	Resource Usage Monitor. A fully automated support tool developed by the Capacity Management (CM) team, which entails the daily capture of system and **V***IST***A** option workload information from participating sites.
Turn-around message	The mail message that is returned to the KMP-CAPMAN mail group detailing the system workload change over the previous reported session.

RESOURCE USAGE MONITOR
RUM PACKAGE

TECHNICAL MANUAL

Version 1.0

December 1998

Department of Veterans Affairs
V*IST***A** Software Development
Office of Chief Information Officer

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